Weather Index-based Insurance in China: The Challenges of Dealing with Data

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Introduction (1)

- Background:

  - Growing frequency and severity of extreme weather events in China causing very high economic losses

  - Lack of modern risk management mechanisms to cope with these perils

Introduction (2)

- Launch of a Sino-German project in 2008:

  - **Funding agency**: the German Federal Ministry for the Environment, Nature Conservation and Nuclear Security, BMU

  - **Main partners**: German Technical cooperation (GTZ), China Insurance Regulatory Commission (CIRC), National Climate Center of China Meteorological Administration

  - **Aiming at** developing suitable weather insurance products on the basis of parametric triggers

Introduction (3)

- Developing a weather-index based insurance implies:
- Collecting and analyzing weather/climate and loss data to find a trigger

Data screening to determine a pilot area (1)

- Identification of areas in China suitable for developing and launching weather risk index insurance

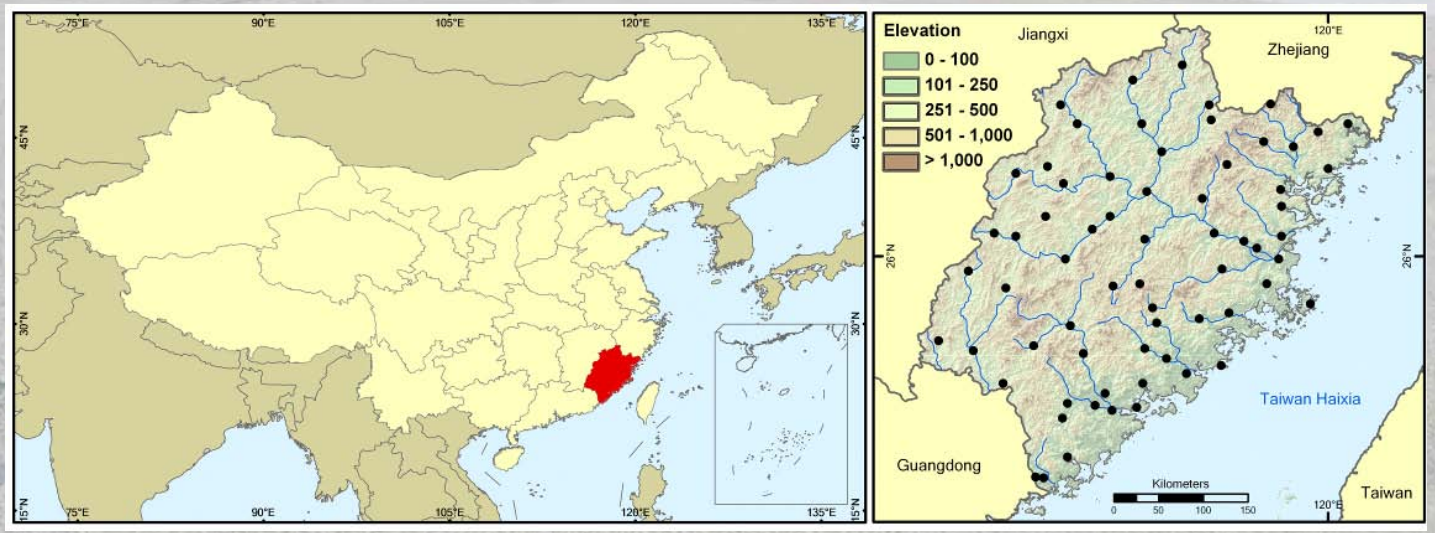
- According to the following criteria:

- Weather data available for at least 30 years
- Significant number of weather stations
- Existence of significant weather risks which cause losses for the local economy
- The risk is independent
- High population density/Large number of potential clients

- Result: Fujian province was chosen as a pilot area

Data collection: Weather data (1)

- Daily wind and daily precipitation were collected for the period 1961-2009 for the 66 climate stations of CMA based in Fujian province
- Other sources providing weather data: Office of Flood Control and Drought Relief, Agricultural Bureau, Forestry Bureau, etc.



Location of Fujian Province and the 66 climate stations

Data collection: Weather data (2)

- Reliability of data was checked for the period 1984-2007 for each climate station regarding:

  - daily precipitation: 99% data coverage
  - daily average wind speed: 88-90% data coverage

- Based on the 49-year-long daily wind and precipitation time-series and their specific station coordinates, a Geographical Information System (GIS) was established

Data collection: Economic loss data (1)

- In China, damage and loss data related to weather/climate-induced disasters are recorded by CMA on county-level
- For Fujian province: record of past typhoon events over the last 50 years compiled by the Fujian Climate Center
- The records of damages and losses are mainly based on official reports from county governments

BUT:

- The availability of the different types (agricultural, industrial, economic) loss data is quite low
- Inaccuracies in numbers of typhoon events
- Absence of data
- The reporting is not always accurate as information is not publicly available for national security reasons

SO:

Loss data only used in order to get a general understanding of the direction of losses

Data processing (1)

- Trigger estimation

  - Wind speed and daily precipitation data were overlaid with the direct economic loss data

  - Finding: High economic losses when the maximum daily precipitation and the maximum daily wind speed during a typhoon event are high at the same day

The example of Lianjiang county:

- Whenever the maximum precipitation exceeds 110mm and the maximum wind speed exceeds 16m/s at the same day, high economic losses are triggered

- A six-year return period for the trigger was determined

Data processing (2)

- Back-up system

  In order to guarantee that the system of climate stations is reliable (in case a station fails during a typhoon event), for each of the climate stations, a back-up station was identified measuring the same trigger at the same day on the same threshold.

Data processing (3)

- Challenges

- Challenge in obtaining comprehensive, reliable and harmonized loss data
- Change of climate station's location or instrument might affect time-series
- Density of climate station plays a crucial role

- Solutions

- The homogeneity of data has to be checked
- Weather/climate data might have to be interpolated between stations of different altitude
- Interpolate the results and check the reliability in backup stations
- Interaction with local stakeholders important to identify local needs for an insurance product
- Household surveys to get information from the affected population